

Data Sheet 1.12-1/2 <sup>1)</sup>

# Metal Tank Test Transformer and Transformer Cascade, Type PEO

## Description

Metal tank transformers have an earthed tank (very space saving in the HV laboratory) and a bushing to air. They are provided for indoor (type PEO) or outdoor (type FPEO) operation and well suited for heavy climatic conditions.

Metal tank transformers are designed for higher power and for continuous operation. For short-time operation higher currents than specified in this Data Sheet can be supplied. The exciter winding is divided into two parts which can be connected in series or in parallel for an improved voltage adjustment and power adaptation. The low internal partial discharge recommends the application of metal tank transformers not only for test line operation, wet and pollution testing (which requires higher currents), but also for PD testing.

For the generation of voltages in the range of megavolts, transformers can be cascaded (see figure 4).

Table 1: Operating conditions

Frequency	Hz	50 / 60
Temperature range for indoor installation (type PEO)	°C	5 ... 40
Temperature range for outdoor installation (type FPEO)	°C	-5 ... 40
Average temperature per day	°C	≤ 30
Relative humidity	%	≤ 90
Height above sea level	m	≤ 1000
Duty cycle		Continuous operation

Table 2: Standard climatic conditions for bushing

Temperature	°C	20
Absolute pressure	hPa	1013
Absolute humidity	g/m <sup>3</sup>	11

The transformers are designed with low core induction to guarantee a sine-wave form of the output voltage with lower than 5 % of harmonic distortion in the test system. To prevent increasing of harmonics due to resonant phenomena the systems may be provided with harmonic filters.

The high-voltage windings are of layer type and they are completely shielded to achieve a high-electric strength against transient overvoltages. The windings are short-circuit proof. For more details ask HIGHVOLT directly.

## Special design and accessories on request:

- design for short-time operation with higher currents
- position of the bushing different from standard
- rollers for transportation on floor (smaller types) or rails (larger types) or air cushions (larger types)
- base frame as a oil collecting trough if demanded for emergency cases (smaller types)

<sup>1)</sup> The prior version of the Data Sheet was 1.12/3.

Table 3: Main parameters

Type <sup>2)3)</sup>	Rated output voltage	Rated output current <sup>4)</sup>	Rated output power	Input voltage <sup>5)</sup>	Impedance voltage	
					50 Hz	60 Hz
	kV	A	kVA	V	%	%
PEO 60/60	60	1	60	400	5	6
PEO 300/60	60	5	300	400	6.5	7.8
PEO 40/100	100	0.4	40	400	4.3	5.2
PEO 100/100	100	1	100	400	6.2	7.4
PEO 500/100	100	5	500	500	6	7.2
PEO 200/200	200	1	200	400	5.3	6.4
PEO 400/200	200	2	400	400	4.5	5.4
PEO 1000/200	200	5	1000	1000	6.3	7.6
PEO 300/300	300	1	300	400	5.8	7
PEO 600/300	300	2	600	1000	4.4	5.3
PEO 2000/300	300	6.7	2000	6000	7	8.4
PEO 400/400	400	1	400	400	4.5	5.4
PEO 800/400	400	2	800	500	6.8	8.2
PEO 2000/400	400	5	2000	6000	5	6
PEO 500/500	500	1	500	500	5.5	6.6
PEO 1000/500t	500	2	1000	6000	5.4	6.5
PEO 2000/500	500	4	2000	6000	6.8	8.2
PEO 600/600	600	1	600	500	7.4	8.9
PEO 1200/600	600	2	1200	6000	5	6
PEO 2000/600t	600	3.3	2000	6000	5.4	6.5
PEO 1500/750t	750	2	1500	6000	4.7	5.6
PEO 1000/800	800	1.25	1000	6000	4.8	5.8
2 x PEO 1000/500t	1000	1	1000	6000	17	20
2 x PEO 2000/600t	1200	2	2400	6000	19	23
2 x PEO 1500/750t	1500	1	1500	6000	20	24
3 x PEO 2000/600t	1800	1.33	2400	6000	28	34
FPEO 60/60	60	1	60	400	5	6
FPEO 300/60	60	5	300	400	6.5	7.8
FPEO 100/100	100	1	100	400	6.2	7.4
FPEO 500/100	100	5	500	500	6	7.2
FPEO 200/200	200	1	200	400	5.3	6.4
FPEO 400/200	200	2	400	400	4.5	5.4
FPEO 1000/200	200	5	1000	1000	6.3	7.6
FPEO 300/300	300	1	300	400	5.8	7
FPEO 600/300	300	2	600	1000	4.4	5.3
FPEO 2000/300	300	6.7	2000	6000	7	8.4
FPEO 400/400	400	1	400	400	4.5	5.4
FPEO 800/400	400	2	800	500	6.8	8.2
FPEO 2000/400	400	5	2000	6000	5	6
FPEO 500/500	500	1	500	500	5.5	6.6
FPEO 1000/500t	500	2	1000	6000	5.4	6.5
FPEO 2000/500	500	4	2000	6000	6.8	8.2
FPEO 600/600	600	1	600	500	7.4	8.9
FPEO 1200/600	600	2	1200	6000	5	6
FPEO 2000/600t	600	3.3	2000	6000	5.3	6.4
FPEO 1500/750t	750	2	1500	6000	4.7	5.6
2 x FPEO 1000/500t	1000	1	1000	6000	17	20
2 x FPEO 2000/600t	1200	2	2400	6000	19	23
2 x FPEO 1500/750t	1500	1	1500	6000	22	26
3 x FPEO 2000/600t	1800	1.25	2250	6000	28	34

<sup>2)</sup> The type designation PEO characterizes the indoor type. All types can be supplied in outdoor design with the designation FPEO instead of PEO. The first figure is the rated test power, the second the rated voltage.

<sup>3)</sup> The letter "t" means the transformer is equipped with a transfer winding for cascades.

<sup>4)</sup> The transformers are designed for continuous operation (24h per day), higher currents for short-time operation can be generated. Related details on request.

<sup>5)</sup> The adaptation to different voltages on request.

Table 4: Design, dimensions and weight

Type	Installation	Design group <sup>6)</sup>	Bushing position <sup>7)</sup>	Length x Width x Height <sup>8)</sup>	Total weight	Weight of oil
				(approx.)	(approx.)	(approx.)
				mm	kg	kg
PEO 60/60	Indoor	H	v	850 x 800 x 1700	730	180
PEO 300/60	Indoor	H	v	1300 x 1050 x 1550	2000	600
PEO 40/100	Indoor		h	1780 x 1070 x 1450	1150	370
PEO 100/100	Indoor	H	v	1300 x 1000 x 1900	1550	520
PEO 500/100	Indoor	H	v	1600 x 1350 x 2250	2900	950
PEO 200/200	Indoor	H	v	1700 x 1600 x 3400	4200	1800
PEO 400/200	Indoor	H	v	1750 x 1550 x 3150	4750	1700
PEO 1000/200	Indoor	A	s	3950 x 1800 x 2650	6850	1850
PEO 300/300	Indoor	T	s	4350 x 1750 x 1650	4800	1450
PEO 600/300	Indoor	A	s	4700 x 1800 x 2650	6750	1850
PEO 2000/300	Indoor	A	s	5400 x 2400 x 3200	15000	3700
PEO 400/400	Indoor	T	s	5650 x 2200 x 2300	9700	2650
PEO 800/400	Indoor	T	s	4400 x 1900 x 2800	12000	3400
PEO 2000/400	Indoor	H	v	4000 x 2900 x 6200	25000	9600
PEO 500/500	Indoor	T	s	6000 x 2150 x 2900	10400	3600
PEO 1000/500t	Indoor	A	s	5200 x 2300 x 3400	18000	5400
PEO 2000/500	Indoor	A	s	6300 x 2800 x 3900	22200	6200
PEO 600/600	Indoor	A	s	7100 x 2400 x 3300	13400	4800
PEO 1200/600	Indoor	A	s	6100 x 2600 x 3500	23000	7000
PEO 2000/600t	Indoor	A	s	8100 x 2850 x 3300	26000	8800
PEO 1500/750t	Indoor	A	s	9800 x 2950 x 4100	30500	11100
PEO 1000/800	Indoor	A	s	9600 x 2850 x 4400	22600	8400
2 x PEO 1000/500t	Indoor	C	s	13000 x 6200 x 7800	42000	10800
2 x PEO 2000/600t	Indoor	C	s	17000 x 4500 x 9000	60000	17600
2 x PEO 1500/750t	Indoor	C	s	20000 x 5000 x 11000	72000	22200
3 x PEO 2000/600t	Indoor	C	s	27000 x 5500 x 13000	95000	26400
FPEO 60/60	Outdoor	H	v	850 x 800 x 1700	730	180
FPEO 300/60	Outdoor	H	v	1300 x 1050 x 1550	2000	600
FPEO 100/100	Outdoor	H	v	1300 x 1000 x 1900	1550	500
FPEO 500/100	Outdoor	H	v	1600 x 1350 x 2250	2900	950
FPEO 200/200	Outdoor	H	v	1700 x 1600 x 3400	4200	1800
FPEO 400/200	Outdoor	H	v	1750 x 1550 x 3150	4750	1700
FPEO 1000/200	Outdoor	A	s	3950 x 1800 x 2650	6850	1850
FPEO 300/300	Outdoor	A	s	4350 x 1750 x 2150	4900	1500
FPEO 600/300	Outdoor	A	s	4700 x 1800 x 2650	6750	1850
FPEO 2000/300	Outdoor	A	s	5400 x 2400 x 3200	15000	3700
FPEO 400/400	Outdoor	A	s	5650 x 2200 x 2600	10000	2700
FPEO 800/400	Outdoor	A	s	4400 x 1900 x 2800	12000	3400
FPEO 2000/400	Outdoor	H	v	4000 x 2900 x 6200	25000	9600
FPEO 500/500	Outdoor	A	s	6000 x 2150 x 3200	11000	3650
FPEO 1000/500t	Outdoor	A	s	5200 x 2300 x 3400	18000	5400
FPEO 2000/500	Outdoor	A	s	6300 x 2800 x 3900	22200	6200
FPEO 600/600	Outdoor	A	s	7100 x 2400 x 3600	13800	4900
FPEO 1200/600	Outdoor	A	s	6100 x 2600 x 3500	23000	7000
FPEO 2000/600t	Outdoor	A	s	8100 x 2850 x 3400	26000	8800
FPEO 1500/750t	Outdoor	A	s	9700 x 2950 x 4200	31000	11100
2 x FPEO 1000/500t	Outdoor	C	s	13000 x 6200 x 7800	42000	10800
2 x FPEO 2000/600t	Outdoor	C	s	17000 x 4500 x 9000	60000	14000
2 x FPEO 1500/750t	Outdoor	C	s	20000 x 5000 x 11000	72000	17600
3 x FPEO 2000/600t	Outdoor	C	s	27000 x 5500 x 13000	95000	21000

- <sup>6)</sup> The design groups are:  
A -steel tank with conservator  
C-cascade.  
H-hermetically sealed tank, corrugated tank  
T-steel tank without conservator, indoor application only, in case of outdoor operation group A
- <sup>7)</sup> The bushing is arranged in: h -horizontal position  
s -slanting position  
v -vertical position
- <sup>8)</sup> including bushing and screening electrodes

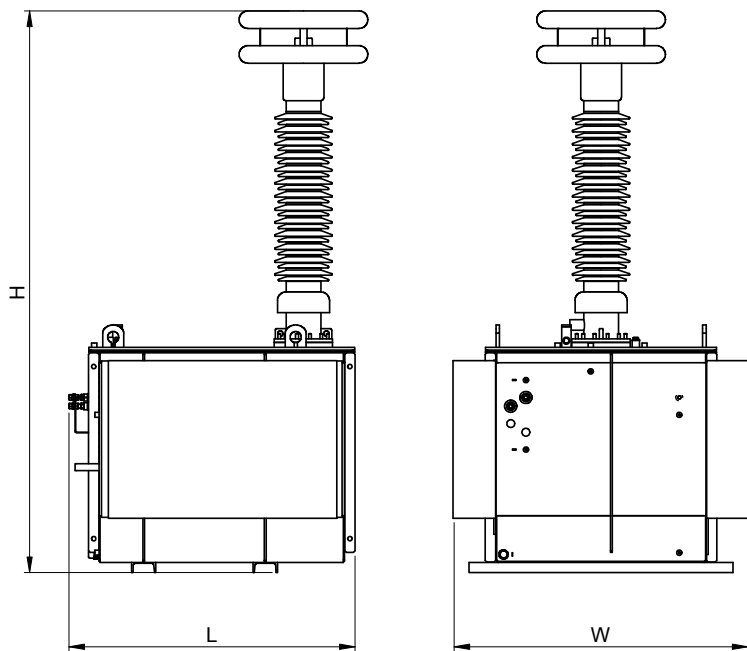


Figure 1: Design group H

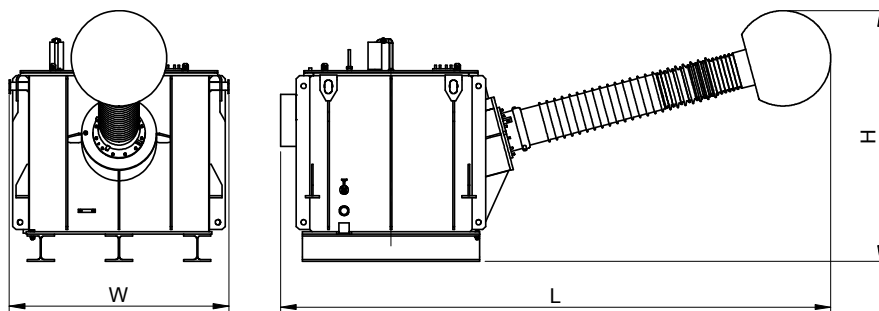


Figure 2: Design group T

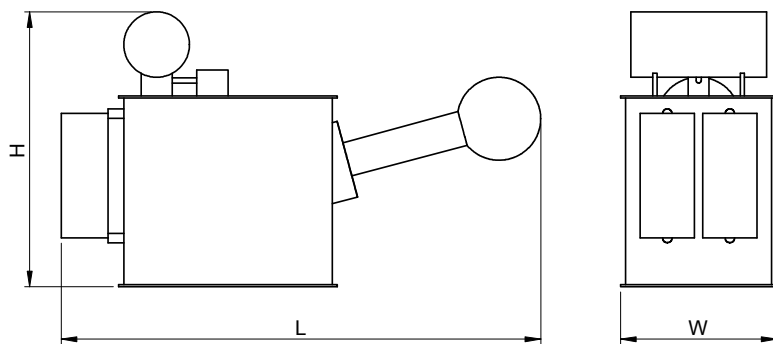


Figure 3: Design group A

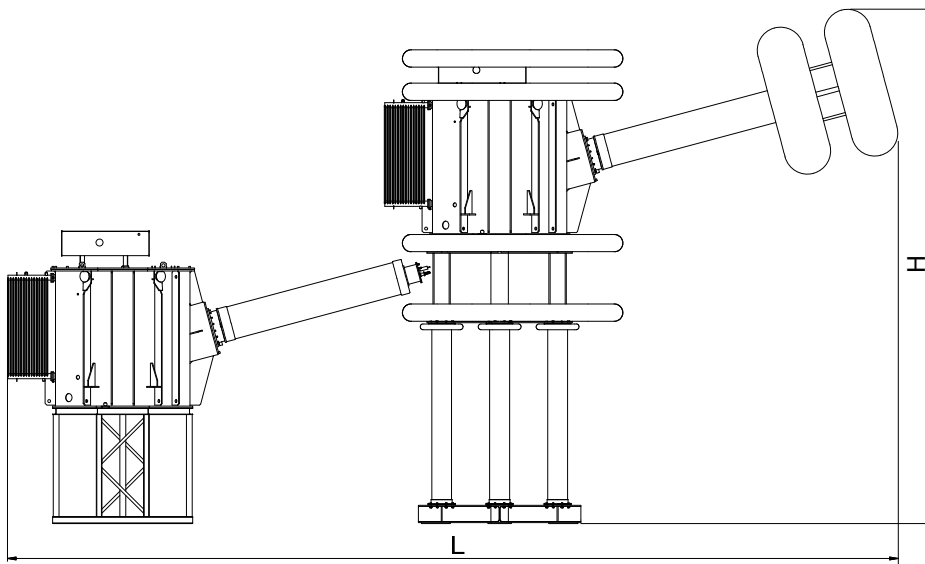


Figure 4: Design group C

### Type designation

Indoor installation:

PEO a/b

a = rated output power in kVA

b = rated output voltage in kV

Outdoor installation:

FPEO a/b

a = rated output power in kVA

b = rated output voltage in kV